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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/852,158	05/06/97	MATHUR S	MS1-151US

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EXAMINER	
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ART UNIT	**PAPER NUMBER**
2755	5

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 08/852,158	Applicant(s)
	Examiner	Group Art Unit 2755

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication .
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

☒ Responsive to communication(s) filed on 5/6/97.

☐ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 1 1; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) 1-40 is/are pending in the application.

Of the above claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-40 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claim(s) _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 11 9(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 1 7.2(a)).

*Certified copies not received: _____.

Attachment(s)

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☒ Notice of Reference(s) Cited, PTO-892

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Interview Summary, PTO-413

☐ Notice of Informal Patent Application, PTO-152

☐ Other _____

Office Action Summary

DETAILED ACTION

1. Claim Rejections - 35 U.S.C. § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 & 8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Matsumoto (US Patent 5,835,765) in view of Kubo (U.S. Patent 5,881,284).

As to claim 1, Matsumoto teaches a method of controlling memory usage (effectively utilizing the primary storage, c19 l37-51) in a computer system having limited physical memory (storage area has a finite size, c9 l5-7) wherein one or more application programs execute in conjunction with an operating system (execute plural application programs in parallel, Id.) comprising the following steps: wielding operating system control over said one or more application programs to minimize memory usage (resource manager 15 checks the amount of memory used (S114), c16 l28-35. Matsumoto does not teach the multiple memory thresholds in connection with controlling applications.
Kubo teaches setting a plurality of memory thresholds (threshold values are provided, c41 l16-23). Also, Kubo teaches (job selector 4 selects ... on the basis of ... the resource utilization, c5 l25-30) which corresponds to the increasingly critical memory thresholds wielding increasing control over the applications.
It would have been obvious to combine the multiple threshold scheme as taught by Kubo with the teachings of Matsumoto because an incremental governor provides a systematic escalation of constraints on program operations, thereby facilitating the most efficacious processing of user applications by enabling executions to continue to certain times at which commensurate measures are triggered to maintain system integrity.

As to claim 8, one skilled in the software engineering art, working on memory conservation, would have included a provision for discarding read-only memory. The practice of efficiently managing memory directs disposal of storage sections that are not currently in use so that other pages can utilize the unused locations which are reserved but not needed/exploited.

3. Claim 2 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Matsumoto (US Patent 5,835,765) in view of Kubo (US Pat 5,881,284) as applied to claim 1, and further in view of Bishop et al. (U.S. Patent 5,826,082).

As to claim 2, Bishop teaches at a less critical memory threshold (resource manager determines in decision block 204, c4 l52-62) interacting with at least one of the application programs to limit its use of memory (suspend a prior request, Id.). Bishop does not teach the termination condition. Matsumoto teaches at a more critical memory threshold, terminating at least one of the application programs without allowing its further execution (storage area has a finite size. When a program is executed exceeding this finite size, the program ends immediately and an abnormal end (error) is generated, c9 l5-7). It would have been obvious to combine the teaching of Bishop with Matsumoto as modified because the initial memory limitation on an application allows the system to maintain operations and reduce memory use, instead of immediately employing drastic measures (i.e. terminating an application).

4. Claims 3-4 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Matsumoto (US Patent 5,835,765) in view of Kubo (US Pat 5,881,284) as applied to claim 1, and further in view of Kannan et al. (U.S. Patent 5,815,702).

As to claim 3, Kannan teaches prompting a user to designate at least one of the applications programs (prompt 400 provides instructions 411, c7 l34-48) and then requesting it to close itself (user close 319 the application, which in turn causes the operating system 111 to terminate 321 the application 105 and reclaim any of its resources, c8 l4-13). It would have been obvious to combine Kannan with Matsumoto because the user's control over application operation/termination allows saving data that might otherwise have perished when the application was eliminated.

As to claim 4, Kannan teaches prompting a user to designate at least one of the applications programs (prompt 400, c7 l34-48) and then terminating it without allowing its further execution (terminate the application with End Process button 403, Id.). It would have been obvious to combine Kannan with Matsumoto because the user may have no need of preserving application data and therefore could simply stop that application in order to free system resources.

5. Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Matsumoto (U.S. Patent 5,835,765) in view of Kubo (U.S. Patent 5,881,284) as applied to claim 1, and further in view of Bishop et al. (U.S. Patent 5,826,082) and Jewett et al. (U.S. Patent 5,317,752).

As to claim 5, note the rejection of claim 2 in regard to the first and second thresholds for the respective limiting and terminating of an application. Jewett teaches (processes ... perform some cleanup activity as required for the particular application, c25 l3-11) which corresponds to at a second memory threshold, requesting at least one of the application programs to close itself. It would have been obvious to combine the cleanup teaching in Jewett with Matsumoto as modified because the severity of the situation may warrant remedial actions that conclude an application while not rising to the level of the harsh eradication of data through termination of an application.

As to claim 6, note the rejections of claims 2-4 above.

6. Claim 7 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Matsumoto (US Patent 5,835,765) in view of Kubo (US Pat 5,881,284) as applied to claim 1, and further in view of Draves et al. (U.S. Patent 5,950,221).

As to claim 7, Draves teaches reclaiming unused stack memory (system also reclaims stack memory, c7 l48-51). It would have been obvious to combine the memory reclamation as taught by Draves with the teachings of Matsumoto as modified by Kubo because the recycling unused stack memory optimizes system storage.

As to claims 9-16, note the discussion of claims 1-8 above. Claims 9-16 are the same as claims 1-8 basically, except claims 9-16 are computer program product claims and claims 1-8 are method claims.

As to claim 17, note the rejections of claims 5-8 above.

As to claims 18 and 19, the recitations regarding the reclaiming and discarding in connection with further thresholds would have been obvious modifications -- variations on claim 17 above.

As to claim 20, note the rejections of claims 3-5 above.

As to claim 21, note the rejection of claim 20, with the difference of the "requiring" in lieu of "prompting" a user to select the respective application conclusion.

As to claim 22, note the discussion of claim 17 above. Claim 22 is the same as claim 17, except claim 22 is a computer program product claim and claim 17 is a method claim.

As to claim 23, note the discussion of claim 1 above; claim 23 is an apparatus claim and claim 1 is a method claim. Claim 23 is the same as claim 1, but for the added limitation of virtual memory sans secondary storage which is disclosed in the Admitted Prior Art.

As to claims 24-30, note the discussion of claims 2-8 above. Claims 24-30 are the same as claims 2-8 respectively, except claims 24-30 are apparatus claims and claims 2-8 are method claims.

As to claim 31, note the rejection of claim 20 which incorporates the claim 17 discussion too. Claim 31 is the same as claim 20, except claim 31 is an apparatus claim and claim 20 is a method claim.

As to claims 32 and 33, note the rejection of claim 2, which incorporates claim 1 limitations. Claim 32 is the same basically as the features in claim 2 sans the 2nd threshold.

7. Claims 34-35 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Matsumoto (US Patent 5,835,765) in view of Kubo (U.S. Patent 5,881,284) and Bishop et al. (US Pat 5,826,082) as applied to claim 32, and further in view of Kannan et al. (U.S. Patent 5,815,702).

As to claim 34, Kannan teaches sending the message (sends information, c7 l 20) to the application program through its message loop (loop that receives events or messages from the operating system, c4 l53-66). It would have been obvious to combine the messaging as taught by Kannan with the teachings of Matsumoto as modified because the messaging scheme is a preexisting program communications protocol which would facilitate the necessary transmissions.

As to claim 35, Kannan teaches application programs have respective message loops (applications 105 ... include a main event or message loop, c4 l53-66). It would have been obvious to one skilled in the art to send the message to a particular application program that was least recently active because the least recently used (lru) algorithm has proven to be an efficacious memory management method for removing pages out of storage pursuant to memory constraints.

As to claims 36-39, note the discussion of claims 32-35 above. Claims 36-39 are the same as claims 32-35, except claims 36-39 are computer program product claims and claims 32-35 are method claims.

8. Claim 40 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Kannan et al. (US Patent 5,815,702) in view of Bishop et al. (US Pat 5,826,082).

As to claim 40, Kannan (c4) teaches an application program (application, such as a word processor) that resides in a computer-readable memory (memory location that
stores, for the process that is the application 105) for execution by a processor (processor 119) in -conjunction with an operating system (operating system 111) the application program having a message loop that receives messages from an operating system (message loop that receives events or messages from the operating system) the application program being responsive to a particular message received through its message loop (receives from the operating system ... and provides them to the application). Kannan does not teach the application minimizing its memory use.
Bishop teaches an application program ... minimize its current use of memory (resource manager determines in decision block 204 ... suspend a prior request, c4 l52-62). It would have been obvious to combine the memory constraining as taught by Bishop with the teachings of Kannan because the application memory minimization performed through the messaging system is an unobtrusive/transparent scheme for maintaining operations within the storage parameters.

9. The prior art of record and not relied upon is considered pertinent to the applicant's disclosure. Each reference disclosed below is relevant to one or more of the Applicant's claimed invention.
U.S. Patent No. 5,210,872 to Ferguson et al. which teaches the correlation of task execution with memory allocation/consumption;
U.S. Patent No. 5,619,656 to Graf which teaches the killing/stopping of programs which exceed system thresholds.

10. Requested Format of Amended Claims:
Please help expedite the prosecution of this application by including the text of all claims which remain in the case in your amendment response. Please label each amended claim as (AMENDED), or (TWICE AMENDED), or (THREE TIMES AMENDED), etc., after the claim number. Please label each unchanged claim (UNCHANGED) after the claim number [meaning the claim is the same as originally filed]. Please label each canceled claim (CANCELED) after the claim number. The text of a canceled claim does not need to be included. This format is not mandatory, however, it will help expedite the processing of your application. Your cooperation is appreciated.

11. Request for copy of Applicant's response on floppy disk:
The Examiner requests that any amendment response be in paper form accompanied by a 3 ½ inch IBM format floppy disk which contains a file copy of

the amendment response in WordPerfect, Microsoft Word, or in ASCII text format. Please include all pending claims, as detailed above. Only the paper copy will be entered - the floppy disk file will be considered a duplicate copy. Signatures are not required on the disk copy. The floppy disk copy is not mandatory, however, your cooperation is appreciated.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Opie whose telephone number is (703) 308-9120.

ALVIN E. OBERLEY
SUPERVISORY PATENT EXAMINER
GROUP 2700